Applied Optics

A monthly publication of the
Optical Society of America

John N. Howard, Editor

Patricia R. Wakeling, Managing Editor

INDEX TO VOLUME 2 1963

Subject 1344
Author 1355

Names of people and companies occurring in filler photograph captions have not been included in this index.

Published monthly by the Optical Society of America, Inc., in cooperation with the American Institute of Physics, at 20th and Northampton Streets, Easton, Pa. Editorial and advertising offices: 1155 16th St. N.W., Washington, D.C. 20036. 202-Di7-4131. Supported in part by a grant from the National Science Foundation. Subscription rates: $6.00 to OSA members, $8.00 other AIP Societies' members; nonmembers and libraries: $10.00 per year. Single copies $3.00. Second class postage paid at Easton, Pa. © Copyright 1963 by the Optical Society of America.

1963 Feature Editors:

January	**James G. Baker**
February	**James G. Baker**
March	**W. Lewis Hyde**
April	**F. Dow Smith**
May	**R. A. Woodson**
July	**Mary E. Warga**
September	**Mary E. Warga**
October	**Seymour Rosin**
November	**Earle K. Plyler**
December	**Donald P. Feder**

Subject Index to Volume 2*

Key to Index Use

1. Subjects, not titles, have been indexed.
2. Principal subjects are given in boldface type. Cross-referenced subjects which should be consulted for more thorough coverage are given in italics after the principal subject.
3. (L), (N), (B), (P) indicate: (L) Letter to the Editor; (N) from notes in one of the departments and not in a regular article; (B) book, or book review; (P) patent. (E), (T), (E/T) (T/E) indicate that the article is experimental, theoretical, or both.

Aberrations
Catadioptric flat-field camera (T), 1081
Measurement of distortion in photographic objectives (E), 759 (L)
Null corrector for paraboloidal mirrors (T/E), 153

Absorption, Adsorptance, Adsorption
Atmospheric infrared bands at nonuniform pressures (T), 605
Beer's law and optimum transmittance in measurements (T/E), 937
Cell for multiple pass (E), 764 (L)
Coefficients of krypton in 600–886Å region (E), 947
Infrared
Far, at liquid helium temperature from chromium ions in ruby (E), 977 (L)
Spectral, of solids 2–25 μ (E), 1169
Water, on walls as source of measurement errors (E), 1196
Mercury vapor of resonance radiation (E), 1323
Muscovite spectrum, alteration by KBr pellet preparation (E), 177 (L)
Ozone in 4.75-μ region of solar spectrum (E), 581
Solar, ordinates for calculations (T/E), 109, 810
Spectra
Band for atmospheric slant paths (T), 515
Infrared, of thin films, 652 (P)
Magnesium hydroxide and calcium hydroxide (E/T), 1147
Water
In 2.7-μ band (T/E), 1117
Total by vapor in near infrared (E), 585
Spectrophotometer, atomic (E), 931
Spectroscopy at high resolution, application to simple molecules (E), 909

Aerosols
Optical measurements in cloud chamber (E), 207

Alignment
Interferometer (T), 541 (L)
Optical instrument, 1168 (P)

Aluminum
Surface, appearance of uncolored anodized (E), 448 (L)

Amplifier
Simple voltage, for photovoltaic cells (E), 249

Angle Measurements (see also *Measurements*)
Interferometer for precision (E), 762 (L)
Mechanism, 1316 (P)

Arcs
Imaging furnace, kaleidoscope to obtain uniform flux (T/E), 265
Jet-controlled, excitation of second spectra (E), 635
Vacuum, spectral line profiles in magnetically confined (E), 699

Aspherics
Catadioptric optical system aberrations in flat-field cameras (T), 1081
Fabrication of surfaces, 328 (N), (E) 1181
Immersion null test (T/E), 1336 (L)

Astrometry
Correction of measured star positions to standard coordinates (E/T), 17
Problems of long-focus photographic (E), 9
U. S. Naval Observatory 60-in. reflector (E), 1

Astronomy (see also *Image Formation, Photometry, Telescopes*)
Cameras for, 549 (P)
Correction of photographically measured star positions (E/T), 17
Image orthicon at Dearborn Observatory (E/T), 157, 810
Infrared, 8–14 μ, photometer (E), 749
Limitations of image quality of large telescopes (E/T), 23
Photomultipliers for pulse-counting applications (E), 181
Solar observatory on Long Island (E), 93
Solution of Kirkwood gaps in asteroids, 1100 (N)
Spectrophotometer, dual-channel pulse-counting (E), 165

Astrophysics
Contributions of W. W. Coblentz (E), 1101

Atmosphere
Ground-level abundance of nitrous oxide, methane, and carbon monoxide (E), 176 (L)
Infrared
Absorptances of bands at nonuniform pressures (T), 605
Transmission
Slant paths (T), 561
Solar radiation (E/T), 887
Low sun solar phenomena (E), 199
Spectral band absorptance for slant paths (T), 515

Atomic Spectra (see *Spectra*)

Beam Splitter
Autocollimator, automatic, 1270 (P)
Continuously variable (E), 1203 (L)

Beer's Law
Optimum transmittance in absorption measurements (T/E), 937

Binoculars
Improved mechanical adjustment, 1270 (P)
Optical system for zoom, 1180 (P)

Blackbody
Spectral variation of radiation (T), 1113

Bolometers
Characterization of detectors (T/E), 1201
Detectivity of cryogenic (T), 649 (L)

Books Received, 219

Books Reviewed
Advances in Glass Technology. American Ceramic Society. Reviewed by N. J. Kreidl, 589
Advances in Spectroscopy, Vol. 2. Edited by H. W. Thompson. Reviewed by D. A. Ramsay, 740
Advances in X-Ray Analysis, Vol. 5. Edited by William M. Mueller. Reviewed by George L. Clark, 806
Annotated Bibliography on Soft X-Ray Spectroscopy. H. Yakowitz and J. R. Cuthill. Reviewed by M. Parker Givens, 885

* Prepared by Franklin S. Harris, Jr., Aerospace Corporation.

Atlas of Optical Phenomena. Michel Cagnet, Maurice Françon, and Jean Claude Thrierr. Reviewed by A. I. Mahan, 908

Atmospheres of Mars and Venus; A Report of the Space Science Board. William W. Kellogg and Carl Sagan. Reviewed by Robert M. Chapman, 297

Classical Electrodynamics. John David Jackson. Reviewed by George Shortley, 480

Color in Business, Science and Industry. Deane B. Judd and Gunter Wyszecki. Reviewed by Henry Hemmendinger, 1108.

Elsevier's Dictionary of General Physics, in Six Languages. W. E. Clason. Reviewed by Erik Ingelstam, 908.

Diffuse X-Ray Reflections from Crystals. W. A. Wooster. Reviewed by C. A. Taylor, 885

Direct Observations of Imperfections in Crystals. J. B. Newkirk and J. H. Wernick, editors. Reviewed by W. C. McCrone, 298

Electroluminescence. H. K. Henisch. Reviewed by H.-E. Gumlich, 886

Elements of Infrared Technology: Generation, Transmission and Detection. Paul W. Kruse, Laurence D. McGlauchlin, and Richmond B. McQuiston. Reviewed by J. S. Garing, 358

Fifty Years of X-Ray Diffraction. P. P. Ewald. Reviewed by Dan McLachlan, Jr., 832

Flammenphotometrie. Second Revised Edition. R. Herrmann and C. Th. J. Alkemade. Reviewed by H. G. Wolfhard, 490

Fundamentals of Infrared Technology. Marvin R. Holter, Sol Nudelman, Gwynn H. Suits, William L. Wolfe, and George J. Zissis. Reviewed by William G. Langton, 364

Fundamentals of Theory Design and Application of Electronic Computers. V. A. Zimin. Reviewed by H. G. Cohen, 1231

Instrumental Optics. G. A. Boutry. Reviewed by R. M. Scott, 584

Introduction to the Methods of Optical Crystallography. F. Donald Bloss. Reviewed by Thomas P. R. Gibb, Jr., 282

ISA Transactions. Volume 1, Number 1. Instrument Society of America. Reviewed by Donald E. Williamson, 290

Japanese Journal of Applied Physics. Reviewed by Bryce Crawford, Jr., 489

Lasers, Generation of Light by Stimulated Emission. B. A. Lengyel. Reviewed by J. Weber, 806

Masers and Lasers. C. A. Hogg and L. G. Sucsy. Reviewed by O. S. Heavens, 479

Mechanism of Glass Polishing. D. C. Cornish. Reviewed by Given W. Cleek, 590

Molecular Spectroscopy. International Union of Pure and Applied Chemistry, Physical Chemistry Section, Royal Netherlands Chemical Society, and Netherlands Physical Society. Reviewed by H. Stammreich, 740

National Catalog of Patents, 223(N)

On the Broadening and Shift of Spectral Lines in the Plasma of a Gaseous Discharge. M. A. Mazing. Reviewed by J. H. Jaffe, 734

On the Spectral Excitation in a Spark Discharge. N. K. Sukhodrev. Reviewed by Cyrus Feldman, 734

Optical Methods of Measuring Plasma Jet Temperatures. H. C. Hottell, G. C. Williams, and W. P. Jensen. Reviewed by R. H. Tourin, 298

Optics publications in *Radio Propagation.* Section D, *Journal of Research of the National Bureau of Standards.* Selected by David M. Gates, 1068

Optics of Flames. F. J. Weinberg. Reviewed by Bernard Lewis, 886

Organic Chemical Crystallography. A. I. Kitaigorodskii. Reviewed by F. W. Cagle, Jr., 282

Photographic History of Mars, 1905 to 1961. E. C. Slipher. Reviewed by Andrew T. Young, 1060

Physik und Technik der Ultrarotstrahlung. Werner Brügel. Reviewed by J. N. Howard, 378

Publications of W. W. Coblentz on Infrared Spectroscopy, 1111(N)

Radioluminescence Yield of Organic Scintillators. Z. A. Chizhikova. Reviewed by J. B. Birks, 740

Report on Available Standard Samples and Related Materials for Spectrochemical Analysis 1960. Compiled by R. E. Michaelis. Reviewed by Edwin S. Hodge, 740

Science of Color. Optical Society of America, 1179(N)

Semiconducting III-V Compounds. C. Hilsum and A. C. Rose-Innes. Reviewed by Henry Levinstein, 315

Studies in Optics. A. A. Michelson. Reviewed by George W. Stroke, 480

Symposium on Spectroscopic Excitation. American Society for Testing Materials. Reviewed by James E. Paterson, 316

Tables of Einstein Functions: Vibrational Contributions to Thermodynamic Functions. Joseph Hilsenrath and Guy G. Ziegler. Reviewed by L. Haar, 838

Technical Glasses. M. B. Volf. Reviewed by Given W. Cleek, 584

Temperature Measurement in Engineering. Volume II. *Design, Construction, and Operation of Effective Temperature Measurement Devices.* H. Dean Baker, E. A. Ryder, and N. H. Baker. Reviewed by S. S. Penner, 282

Thermoelectricity: An Introduction to the Principles. D. K. C. MacDonald. Reviewed by Alton Karoli, 316

Vision Research—An International Journal. Edited by T. Shipley, F. Crescitelli, H. J. A. Dartnall, Y. LeGrand, H. Schober, and A. Sorsby. Reviewed by C. J. Bartleson, 310

Wave Mechanics of Crystalline Solids. R. A. Smith. Reviewed by G. H. Dieke, 490

Bubble Chambers
British National, 1086(N)
Brookhaven, 1024, 1048(N)
Illumination
Of the 80-in. (E/T), 1003
Of the CERN 2-m-hydrogen (E), 1017
Optics (review), 981, 1167, (E/T) 999, (E) 1017
Trigger-circuit (E), 997
University of Michigan, 998 (N)
Windows, (E/T) 999, (E) 1037

Calcium Fluoride
Index of refraction 0.23–9.7 μ (E/T), 1103

Calorimetry
Graphite resistor source of image furnace research (E), 758 (L)
Liquid, for high-energy laser (E), 163 (L)

Camera Tubes (see *Image Tubes*)

Cameras
Astronomical, 549 (P)
New family of flat-field (T), 1081
Photoelectric exposure control, 548 (P)
Scintillation for gamma rays, 652 (P)

Carbon Monoxide
Abundance in ground-level air (E), 176 (L)

Chopper
Electronic, for spectral lamps (E), 542 (L)
Precision disk (E), 1333 (L)

Cloud Chambers
Electronic flash illumination of large Wilson (E/T), 1013
Optical measurement of aerosols (E), 207

Coal
Use of infrared spectra of chars, in research (E), 1109

Coblentz, W. W.
Astrophysics work (E), 1101
Infrared spectroscopy contributions (E), 1090
Memorial lecture, 1097 (N)
Personal sketch, 1089
Radiometry, influence on, 1098

Collimators
Penetrative radiation to control field of view, 333 (P)

Color
Books, 1108, 1179
Diffusion transfer process, 651 (P)
Masking by xerography, 547 (P)
Photography, with electrostatic developing powder, 1316 (P), 1316 (P), 1316 (P)
Projection system, 548 (P)

Colorimeters
For color sorting, 1316 (P)
For mixtures, 1270 (P)

Comparators
Automatic readout with photoelectric detection (E), 1330 (L)
Image inverter for spectral projector (E), 763 (L)
New, 226 (N)
Optical, to show size and shape of workpieces, 332 (P)

Computers
Bi-optric elements for storage, 454 (N)
Lens design by (T), 1233; (T), 1239; (T), 1247; (T), 1257; (T), 1265; (E/T), 1281
Automatic (review) (T), 1209, (T) 1227, (T) 1331 (L)
Optical, 225 (N)
Photographic emulsions for storage media (T), 421

Condensers
New, for sun-powered continuous laser (E), 827

Conferences (see *Meetings*)

Constants (see also *Optical Constants*)
Force, policy on publication, 222 (N)

Coronagraphs
Reduction of scattered light in (E), 131
Reflecting (E), 977

Cosmotron
Brookhaven, 1015 (N)

Counters
Photon, 226 (N)

Crystals
Growth kinetics, 1132 (N)
Growth of large, 1132 (N)
Method of evaluating laser potentialities (E/T), 291

Crystallography
Methods of optical, 282 (B)
Observations of imperfections, 298 (B)
Organic chemical, 282 (B)

Densitometer
For scanning angularly oriented spectral lines (E), 1207

Depth Measuring Device, 1270 (P)

Detectors (see also *Radiometry*)
Bolometric characterization (T/E), 1201 (L)
Information capacity of radiation (T), 351
Infrared, liquid nitrogen dewar attachment (E), 760 (L)
Lead sulfide
Recovery from intense radiation, 454 (B)
Variation of response with incident angle and orientation (E), 1204 (L)
Photoionization, for the vacuum ultraviolet (E), 735

Diffraction
Losses in laser interferometers (T), 544, 545 (L)

Diffusion
Calculation of coefficients, from Rayleigh interference fringes (T), 66 (L)

Discharges
Gaseous, enhancement of krypton by mercury and xenon (E/T), 299

Dispersion
Infrared
Gas absorption lines (T/E), 495
Of some oxide glasses (E), 741
Prism, with no deviation, 1168 (P)

Editor
From the, 30, 218, 228, 420, 463, 616, 714, 853, 946, 1036, 1140, 1256

Einstein Functions
Tables of, 838 (B)

Electrodynamics
Classical, 480 (B)

Electroluminescence, 886 (B)

Electro-optics
Effect
Gallium arsenide (E), 647 (L)
Hexamethylenetetramine (E), 320 (L)
Quartz (E), 868 (L)
Light modulation
Cubic crystals (T/E), 839
Stressed plate (E/T), 1175
Quartz with UHF (E), 868 (L)

Emission
Infrared, interferometric measurement of lines (E), 1155
Sky at 15–26 μ (E), 571

Errata, 725, 810, 1167, 1250

Evaporation
Heated filament material (T), 1055

Exploding Wires
As blast shutter (E), 441
Optical pumping of lasers using (E), 451 (L)

Fabry-Perot (see also *Interferometry and Films*)
Diffraction patterns of neodymium in glass laser (E), 867
Etalons used in PEPSIOS scanning spectrometer (E/T), 873

Faraday Rotation
In FeNi films (E/T), 411

Fiber Optics
Combination of images for three-color television, 333 (P)
Light-conducting, 1168 (P)
Measurement of hot objects, 652 (P)

Fibers
Glass, for structural purposes, 548 (P)
Crossed glass, for flying spot film measuring (E), 1025

Filaments
Evaporation rate from heated (T), 1055

Films
Apparatus for deposition for electrical conduction and light transmission, 1116 (P)
Dielectric coatings, selection of multilayer, for Fabry-Perot (E), 727

Effect of MgF_2 and SiO on reflectance of aluminized mirrors (E), 156 (L)
Faraday rotation in FeNi (E/T), 411
Image intensifying photosensitive, 548 (P)
Magnesium fluoride, unusual property in infrared (E), 91 (L)
Multilayer reflection coatings on a metal mirror (T), 445
Silver for multiple-beam interferometry (E), 539, 725 (L)
Thickness control for vacuum deposited, 330 (P)
Thin, low index, on infrared transmitting materials, 331 (P)

Filters
Alkali metal ultraviolet, 330 (P)
Birefringent for monochromator use (E/T), 193

Flames
Infrared spectroradiometry of liquid propellant (E), 1133
Optics of, 886 (B)

Flash Illumination
Large Wilson cloud chamber (E/T), 1013

Flying Spot
Film measuring machine with crossed glass fibers (E), 1025

Fourier Transforms
Correction of phase errors in interferograms (T), 491, 1332 (L), 1332 (L)

Furnaces
Graphite resistor source for image research (E), 758 (L)
Solar and arc imaging, kaleidoscope for uniform flux in (T/E), 265

Gallium Arsenide
Electro-optic effect (E), 647 (L)

Gases
Circulating loop for infrared system for reacting (E), 1165

Gauges
Thickness, low-cost noncontact (E), 92 (L)

Germany
Optics in German Democratic Republic, 1069

Glass
Advances in technology, 589 (B)
Alkali silicates with bi- and trivalent silicates, 1180 (P)
Coating to reduce crazing, 331 (P)
Fibers, 548 (P), 549 (P)
High chemical durability, 549 (P)
Infrared transmitting, 331 (P)
Lithia-free soft, 652 (P)
Method of preparing, 1180 (P)
Optical, new, 454 (N), 454 (N), 454 (N), 547 (P)
Oxide, infrared dispersion of (E), 741
Polishing, 590 (B)
Technical, 584 (B)

Gratings (see also *Spectrographs*)
Concave for astronomical spectrographs (E/T), 187
Concave, spectrograph, wavelength measurement (E), 715
High-resolution, spectrographs, predisperser for (E), 963
Platinum or gold for surface at grazing incidence (T/E), 450 (L)
Spectrometer or analyzer, 330 (P)
Spectrometer, fore-prism drive (E), 175(L)

Helium
Continuum source for 600–1100Å (E), 617

Heterodyning
Optical, spurious harmonic generation in (E), 823

History
Coblentz, W. W., 1089, 1090, 1098, 1101
Photographic, of Mars, 1060 (B)
Young, Thomas, 639

Illumination
Bubble chambers (E/T), 1003, (E) 1017
Cloud chamber, large Wilson (E/T), 1013
For optical devices, 1180 (P)
Slit source of the Hough-Powell digitizer (E/T), 1085 (L)

Image Evaluation (see also *Transfer Functions*)
By spot diagrams with computer (T), 1247
Optical, and the transfer function (T/E), 335
Computer to minimize spot sizes (E/T), 1281
Role of eikonal and matrix methods (T), 1239

Image Formation
In aerial cameras (T/E), 545 (L)
Limitation of quality in large telescopes (E/T), 23
Stellar telescopic analyzer (E/T), 31

Image Intensifiers
Photosensitive films, 548 (P)

Image Inverters
Spectral projector comparator (E), 763 (L)

Image Motion
Experimental transfer characteristics and air conditions in aerial photography (E/T), 379

Image Projection Systems
Device, 1116 (P)
Multiple superimposed images, 651 (P)

Image Recording
Xerography and magnetic means, 547 (P)

Image Rectifier
Photogrammetry, 651 (P)

Image Stabilizer
For telescope, 651 (P)

Images
Spectrographic, brighter by using anamorphic optics (T), 755

Image Tubes
Image orthicon astronomy at Dearborn Observatory (E/T), 157, 810
Infrared to visible, 333 (P)
Isocon scan (E/T), 253

Information
Capacity of radiation detectors and of light (T), 351
Optical storage in solids (T), 393
Retrieval systems, 224 (N)
Storing and retrieval by optical method (T/E) 387, 764
Storing in computer with photographic emulsions (T), 421

Infrared
Absorption, absorptance
Atmospheric gas bands at nonuniform pressures (T), 605
Chromium ions in ruby in far, at liquid helium temperatures (E), 977 (L)
Magnesium hydroxide and calcium hydroxide spectra (E/T), 1147
Measurement errors due to water on walls (E), 1196 (L)
Near, total, by water vapor (E), 585
Water band at 2.7 μ (T/E), 1117
Atomic emission spectra (E), 691, 1155
Attenuating media, literature review, 454 (N)
Books, 378, 364, 358
Detectors
Hot-box, 333 (P)
Liquid-nitrogen dewar attachment (E), 760 (L)
Mount, cooled for cell, 1316 (P)
Dispersion
Of some oxide glasses (E), 741
Emission of sky in 15–26 μ region (E), 571
Far, bibliography, 1132 (N)
Glasses for transmission, 331 (P)
Image converter to visible, 333 (P)

In-line spectrometer, 331 (P)
Interferometer for earth temperature distribution, 1100 (N)
Magnesium fluoride, unusual property in (E), 91 (L)
Modulated, to measure properties of materials, 651 (P)
Near, literature on, attenuating media, 454 (N)
Photometer, astronomical for 8–14 μ (E), 749
Polarized radiation in magneto-optical studies of semiconductors (E), 527
Proximity warning for aircraft installation, 333 (P)
Ranging system, 1270 (P)
Reflection and transmission
Materials in 2–50 μ region (E), 591
Materials, bibliography, 596
Refracting system, 454 (N)
Scanner, 332 (P)
Scanning system, reticle design (T/E), 229
Solids, absorptance in 2–25 μ region (E), 1169
Source, continuous carbon furnace (E), 1340 (L)
Spectra
Books, 480
Circulating loop for reacting gases (E), 1165
Use in chars in coal structure research (E), 1109
Spectrograph, six-meter Ebert-type (E), 1123, 1127
Spectrometer, two-wavelength, two-frequency ratio recording (E), 969
Spectrophotometers, extraneous radiation effect (T/E), 1141
Optical null double-beam, double-pass (E), 1309
Photometric calibration (E), 1303
Spectroscopy
Dispersion measurement of vibration–rotation lines in gases (T/E), 495
High-resolution, application to study of simple molecules (E), 909
Liquid propellant flames (E), 1133
Transmission
Atmospheric (T), 561
Atmospheric to solar radiation (E/T), 887
Transmitting components, low-index films on, 331 (P)
Units and terminology, 714 (N)

Instruments
Optical (E), 227
Transactions of Instrument Society of America, 290 (B)

Intensity
Continuously variable controller (E/T), 1203 (L)

Interference
Fringes, measurement of photographic records of (E), 487
Rayleigh fringes, calculation of diffusion coefficients from (T), 66 (L)
Rings in ruby maser beams (E), 811

Interferometers
Alignment (T), 541 (L)
Comparators for line standards (E), 471
Laser
Diffraction losses in (T), 544, 545 (L)
Mode selector (E), 448 (L)
Measurements
Velocity of light (E), 481
Vibration amplitudes (E), 1061
Microscope, dichroic multiple-beam (E), 540 (L)
Plano, instrument, 822 (N)
Precision angle measurements (E), 762 (L)
Quantum limit to wavelength determination (T), 465
Shearing for measurement of transfer functions of the microscope (E/T), 371
Spherical mirror oscillating (E), 865 (L)

Interferometry
Grating light divider, 1322 (P)
Measurement of infrared atomic emission lines (E), 1155
Multiple-beam, silver films for (E), 539, 725 (L)
Phase error correction (T), 491, 1332 (L), 1332 (L)
Scanning spectrometer, high-resolution (E/T), 873
Selection of multilayer dielectric coatings for Fabry-Perot (E), 727
Tilted-plate, with large plate separation (E), 817, 1330 (L)
Twyman-Green, optical quality and radiation patterns of ruby lasers (E), 855

Integrating Spheres
Asymmetry of (E), 631

Ionization of Gases
Ruby laser (E), 546 (L)

Iron
Group elements, Mn^+, Ni^+, V^+, second spectra, recent work (E), 687
Oxide (FeO), molecule emission spectra (E), 1335 (L)
Wavelength of lines, measured by new technique (E), 177 (L)

Irradiance
New standard of spectral (E/T), 1151

Jeffries–Abragam Effect
In a four-level system (T), 787

Kaleidoscope
With flowing liquids, 1269 (P)

KDP (potassium dihydrogen phosphate)
Refractive index (E), 1334 (L)

Krypton
Absorption coefficients in 600–886 Å region (E), 947
Enhancement by mercury and xenon in gaseous discharges (E/T), 299

Lamps (see *Sources*)

Lasers (see *Masers*)

Lead Sulfide
Variation of response with incident angle and orientation (E), 1204 (L)

Length
International standard (E), 455

Lenses (see also *Optical Systems*)
Adapter, 652 (P)
Adjustable mount, 1322 (P)
Afocal attachment, 549 (P)
Aerial photographic, 548 (P)
Anamorphic system, 333 (P)
Binocular, Erfle-type, 549 (P)
Bubble chamber (E/T), 1003
Catadioptric objective, 548 (P), 549 (P)
Design by computers (see also *Computers*)
By localized two paraxial ray paths (T), 1275
Graphical first-order method (T), 1251
Design data for calculation of optical transfer function (T), 359, (T) 1239
Design of superachromats (T), 553
Dielectric rod, focusing of light (T), 303
For brighter spectrographic images (T), 755
Gaussian, wide-angle, 549 (P)
High-aperture objective, 550 (P)
High-speed, cinematographic wide-angle, 548 (P)
High-speed, wide-angle, photographic 548 (P)
Highly corrected optical objective, 1180 (P)
Photographic, high-aperture, small field-of-view, 1180 (P)
Photographic, measurement of distortion (E), 759 (L)
Photographic objective, 333 (P), 333 (P), 549 (P)

Symmetrical $f/5.6$, 1322 (P)
Symposium designed, 272 (N), (T) 1227, 1331 (L)
Telephoto, 548 (P)
Telephoto converter, 1322 (P)
Television, 548 (P)
Triplet, 550 (P)
Varifocal systems, 549 (P), 549 (P), 1322 (P)
Zoom, 548 (P), 1322 (P), 1366 (P)
Zoom, focusing, 550 (P)
Zoom, mechanical linkages, 549 (P)

Light
Information capacity of (T), 351
Modulation
Cubic crystals (T/E), 839
Gallium arsenide (E), 647 (L)
Quartz at UHF (E), 868 (L)
Production of charge of image recording, 1168 (P)
Rays, angular distribution from a gas discharge source (E), 540 (L)
Velocity, measurement by interferometer (E), 481

Lines
Profile
Polychromator for time-dependent observation (E), 205
Pressure-broadened spectra, errors due to slits, (T), 1195 (L)
Studies of long, magnetically confined, high-current, steady-state vacuum arcs (E), 699

Magnetic Fields
Influence on gas discharge lasers (E), 861 (L)

Magneto-Optics
Studies of semiconductors by polarized infrared radiation (E), 527

Mars
Atmosphere, 297 (B)
Photographic history, 1060 (B)

Masers
Lasers
Abstracts (periodical), 979 (N)
Beam divergence measurements and interpretation (E/T), 319 (L)
Books, 479, 806
Communications, new aspects (T), 311
Continuous, sun-powered, new condenser for (E), 827
Crystals, method of evaluating, for potentialities (E/T), 291
Dictionary definition, 838 (N)
Developments, new, 225 (N), 226 (N), 453 (N), 1131 (N)
Dielectric rod, focusing of light (T), 303
Diffraction losses in interferometers (T), 544, 545 (L)
Gaseous, power dip at line center (T), 869 (L)
Helium–argon
Operation at 3.39 μ (E/T), 317
Helium–neon
Source for light scattering measurements (E), 1205
High-index of refraction spherical sheath composite rod (E/T), 431
Indium phosphide injection, 872 (N)
Intensity distribution of ruby beams (E), 1198 (L)
Interference rings in ruby beams (E), 811
Interferometer
Mode selector (E), 448 (L)
Spherical mirror oscillating (E), 865 (L)
Hole-burning model of oscillation (E), 807, (T) 1085 (L)
Liquid, 872 (N)
Liquid calorimeter for high-energy (E), 163 (L)
Magnetic fields, influence upon gas discharge (E), 861 (L)
Neodymium
Far-field Fabry-Perot diffraction patterns (E), 867
Operation of, at 9180 Å (E/T), 87 (L)
Performance of a CW (E), 833
Optical pumping, nondestructive by high explosives (E), 1339 (L)
Optical pumping using exploding wires (E), 451 (L)
Radiation transfer by elliptical cylinder reflectors (T), 509
Raman scattering, stimulated, analysis of giant pulse (T), 847
Ruby
Better control of, for, 453 (N)
Characteristics using microwave phototubes (E/T), 767
Ionization of gases (E), 546 (L)
Optical quality and radiation patterns (E), 855
Output spikes, correlation from different portions (E), 151 (L)
Sea water attenuation (E/T), 1202 (L)
Sénarmont polariscope in analysis of light (E/T), 801
Tilted-plate interferometry with large plate separations (E), 817
Transients, analysis, and stability in idealized two-level system (T), 862 (L)
Optical
Applied Optics supplement, 225 (B)
Heterodyne, 453 (N)
Polytechnic Institute of Brooklyn Symposium, 447 (N)

Measurements
Analysis of microscopic particles in blood, 652 (P)
Angles
Interferometer for precision (E), 762 (L)
Ronchi ruling (E), 77 (L)
Aspherics, immersion test (T/E), 1336 (L)
Depth, 1270 (P)
Distance by improved geodimeter, 330 (P)
Gauge, low-cost noncontact thickness (E), 92 (L)
Homogeneity of large-aperture glass plates (T), 1337 (L)
Material particles by modulated infrared, 651 (P)
Optical, of aerosols in cloud chamber (E), 207
Precision, seminars, 1132 (N)
Radiometers with linearized final output, 332 (P)
Sinusoidal test object production and use (T/E), 273
Surveying transit, 652 (P)
Temperature, by fiber optics, 652 (P)
Vibration amplitudes (E), 1061

Meetings
Aerospace and Navigational Electronics, 9th East Coast Conf., Baltimore, Oct. 1963, 410
American Physical Society, 1962 Winter Mtg., Stanford, California, Dec. 1962, 508
American Society of Photogrammetry, 29th Ann. Mtg., Washington, D. C., March 1963, 826
Analytical Chemistry and Applied Spectroscopy, 14th Ann. Pittsburgh Conf., March 1963, 706
Astrophysics, 11th Internatl. Colloq., Liège, July 1962, 271
Electromagnetic Waves and Antennas, URSI Internatl. Symp., Copenhagen, June 1962, 236
Far Infrared Spectroscopy, Internatl. Symp., Cincinnati, Ohio, Aug. 1962, 663
Glass, 6th Internatl. Cong., Washington, D. C., July 1962, 604
High-Speed Photography, VI Internatl. Conf., Scheveningen, Netherlands, Sept. 1962, 570
Hungarian Optical Conf., 2nd, Budapest, May 1963, 962
Information Theory, 1962 Internatl. Symp., Brussels, Sept. 1962, 444
Infrared Radiation, 1st Czechoslovak Conf., Brno, Nov. 1962, 603
Interference and Coherence Conf., Sydney, Australia, Aug. 1964, 629

Lasers and Applications, Ohio State U. Symp., Columbus, Nov. 1962, 440
Lasers, Technical and Military Applications, s'Gravenhage, Netherlands, Apr. 1962, 430
Meter, International Advisory Committee on Definition of, Sèvres, France, Oct. 1962, 501
Millimeter and Submillimeter Conf., IRE, Orlando, Fla., Jan. 1963, 792
Molecular Structure and Spectroscopy, 18th Symp., Ohio State U., Columbus, June 1963, 1042
Molecular Structure and Spectroscopy, Internatl. Symp., Tokyo, Sept. 1962, 663
Optical Maser Symp., Polytechnic Inst. of Brooklyn, New York, Apr. 1963, 826
Optical Society of America, Jacksonville, Fla., March 1963, 726
Optical Society of America, Rochester, N. Y., Oct. 1962, 7
Optics, Topics in, 8th Ann. AFOSR Summer Scientific Seminar, Cloudcroft, N. M., June 1963, 1232
Photographic Instrumentation Engineers, Society of, 7th Technical Symp., N. Y., Aug. 1962, 276
Photography and Spectroscopic Optics, Tokyo and Kyoto, Sept. 1964, 629
Precision Electromagnetic Measurements, Internatl. Conf., NBS, Boulder, Colo., Aug. 1962, 8
Quantitative Spectroscopy, 3rd, and Special Problems of Space Sciences Conf., Caltech, Pasadena, March 1963, 726
Quantum Electronics, Masers and Optical Maser Techniques, 10th Ann. Solid State Circuits Conf., Philadelphia, Feb. 1963, 800
Quantum Electronics, 3rd Internatl. Symp., Paris, France, Feb. 1963, 800
Scattering, Electromagnetic, Interdisciplinary Conf., Clarkson Col. of Technology, Potsdam, N. Y., Aug. 1962, 501
WESCON, 1962, Los Angeles, Aug. 1962, 507
Western Spectroscopy Association, 10th Ann. Mtg., Asilomar, Calif., Jan. 1963, 664

Meetings Calendar, 221, 329, 464, 560, 674, 786, 980, 996 1102, 1302

Mercury
Optical excitation for fluorescence (E), 1323

Methane
Abundance in ground-level air (E), 176

Metric System, 228 (N), 420 (N), 616 (N), 634 (N), 946 (N), 1256 (N)

Microdensitometer (see *Densitometer*)

Microscope
Apparatus for high temperature use, 332 (P)
Condenser for increased resolution, 1270 (P)
Field ion, 222 (N)
Interferometer, dichroic multiple-beam (E), 540 (L)
Objective, 333 (P)
Shearing interferometer to measure transfer functions of objective (E/T), 371

Microspectrophotometry
Spectral properties of biological materials (E), 899

Mirrors
Aluminized, reflectance of and protective coatings of MgF_2 and SiO (E), 156 (L)
Analysis and design by matrix methods (T/E), 1271
Bent axis focusing (E), 761 (L)
Lightweight (E), 623 (N)
Null corrector for paraboloidal (T/E), 153
Scattering by surfaces (E), 977

Modulation Transfer Function (see *Transfer Function*)

Modulators
Electro-optical by stressed plate shutter (E/T), 1175
Optical, push-pull (T), 1197

Molecular Spectra (see *Spectra*)

Monochromators
Birefringent, for high-order grating spectra (E/T), 193
Double systems (T/E), 1049, 1250
Ultraviolet, 1322 (P)

Moon
Near infrared observations of, 222 (N)
Optical problems of television recording from approaching spacecraft (E/T), 41

Muscovite
Alteration of absorption spectrum, by KBr pellet preparation (E), 177 (L)

Navigation
Optical device, 1270 (P)

Nitrous Oxide
Abundance in ground-level air (E), 176 (L)

Optical Activities
Industry, 328, 623, 978, 1088, 1294
Universities, 16, 323

Optical Beats
In ruby laser light sources (E), 807

Optical Constants
Measurement of N and K by photorefractometer (T/E), 1043

Optical Devices
Absorption method to detect impurities, 330 (P)
Afocal, protecting against radiation, 651 (P)
Alignment
Interferometer (T), 541 (L)
Lamps and reflectors, 333 (P)
Optical instrument, 1168 (P)
Automatic focusing, 332 (P)
Automatic leveling, 1168 (P)
Auxiliary, for Kitt Peak telescopes (E/T), 141
Bent-axis focusing mirrors (E), 761 (L)
Combined range and viewfinder, 1116 (P)
Curve comparison, 1116 (P)
Determination of object position, 1116 (P)
Diamond band saw, 408 (N)
Dispersion prism with no deviation, 1168 (P)
Electronic control of optical radiation, 651 (P)
High-index, large-diameter, glass beads for reflection markers, 333 (P)
Illuminating arrangement, 1180 (P)
Image inverting for copying, 550 (P)
Inspecting bodies of revolution, 332 (P)
Justifying system, 549 (P)
Light-tight optical joint, 333 (P)
Microprobe analysis, 822 (N)
Multi-stable optical feedback storage, 331 (P)
Navigation, 1270 (P)
Optical graticules for reducing geophysical prospecting data, 331 (P)
Optical inspection of surfaces by reflection, 331 (P)
Optical positioning of jig borer, 651 (P)
Optical straight line of great accuracy, 224 (N)
Photographic information storage, 330 (P)
Rodolite, optical straight line, 224 (N)
Sighting instrument, 547 (P)

Slicing of optical elements, 454 (N)
Stabilization of optical sighting systems, 332 (P)
Synchronizer with scanning beam, 1168 (P)
Telescopic finder for motion picture camera, 333 (P)
Tool positioning, 1269 (P)
Transducer of electroluminescent cells, 332 (P)
Viewfinder
Block-type Albada, 1180 (P)
Including instrument pointer, 333 (P)

Optical Systems
Anastigmatic catoptric, 550 (P)
Auxiliary, for Kitt Peak telescopes (E), 141
Catadioptric for flat-field cameras (T), 1081
Catadioptric, Bouwers-type, high-aperture, 550 (P)
Design, automatic (review) (T), 1209
Plane mirror, matrix design (T/E), 1271
Scanning, 1116 (P)

Optical Transfer Function (see *Transfer Function*)

Optics
An action program, 653
German Democratic Republic, 1069
Instruments, 584 (B)
Junior science symposium, 453 (N)
Opticists and, 222, 453, 973, 1100, 1328
"Opticists" word, 1328
Physics research in small liberal arts college, 1075
Pictures of phenomena, 908 (B)
Publications of National Bureau of Standards in radio propagation, 1068
Russia, 1132
Studies, 470 (B)
Terminology, 218 (N)
United States, neglected in, 1088
Universities
In the, 16, 323
Michigan, fundamentals of infrared technology course, 739
Minnesota, infrared spectroscopy course, 350
Rochester, summer course in modern optics, 400
Utah, seminars, 224

Overhauser Effect
In four-level system (T), 787

Ozone
Absorption in 4.75-μ solar spectrum (E), 581

Particles
Microscopic, analysis of, 652 (P)
Planetary, interplanetary, and interstellar, wavelength polarization effects (E/T), 67

Patents (see under subject)
National catalog of, 223 (B, N)
University research and policy, 1100 (N)

Photocells
Automatic for film, 548 (P)
Method of forming photoemissive surfaces, 331 (P)
Photovoltaic, simple voltage amplifier for (E), 249

Photoconductors
Lead sulfide, variation of response with incident angle and orientation (E), 1204 (L)
Recovery from intense radiation, 454 (N)

Photodetection
Spurious harmonic generation in optical heterodyning (E), 823

Photoelasticity
Opaque models by reflected light, 331 (P)
Polariscope, 1316 (P)
Scanner for stress pattern, 1269 (P)
Stress-plate shutter for light modulator (E/T), 1175

Photogrammetry
Image rectifier, 651 (P)
Two-stage rectifier, 1270 (P)

Photography (see also *Lenses*)
Aerial, experimental transfer characteristic of image motion and air conditions (E/T), 379
Antihalation and filter layers, 331 (P)
Correction of measured star position to standard coordinates (E/T), 17
Elimination of matting layers, 331 (P)
Emulsions as computer storage media (T), 421
Exposure-charged, produced for image recording, 1168 (P)
High-speed motion picture for transparent drops (E), 1287
Instrumental, 832 (B)
Measurement of interference fringes by (E), 487
Objective for, Gauss-type, 333 (P)
Photometer for, 1270 (P)
Practical aspects of ground targets for aerial cameras (T/E), 545 (L)
Problems in long-focus astrometry (E), 9
Production and use of sinusoidal test objects (T/E), 273
Simple method for photometry (E), 648 (L)
Three-lens system of, and projecting wide-field, 332 (P)
Vocal cords in action, 1100 (N)
Xerographic image reversal, 1168 (P)
Yellow filters of multilayer color elements, 330 (P)

Photoionization
Use as detector for vacuum ultraviolet (E), 735

Photolithography
Projecting device, 549 (P)

Photometry (see also *Polarimetry, Spectrophotometry*)
Amplifier, simple voltage, for photovoltaic cells (E), 249
Astronomical polarization (E/T), 67
Asymmetry of an integrating sphere (E), 631
Extraneous radiation effect on accuracy (T/E), 1141
Flame, 490 (B)
Improved measurement of relative intensity of two beams, 651 (P)
Infrared astronomical, in 8–14 μ region (E), 749
Isocon scanning techniques (E/T), 253
Low level, 1269 (P)
Photoelectric, multicolor for satellites (E), 625
Photographic, device, 1270 (P)
Photographic, simple method for (E), 648 (L)
Photomultiplier, temperature effects in astronomical (E), 51
Visual in solar research (E), 89

Photomixing
Spurious harmonic generation in (E), 823

Photomultipliers
Temperature effects in, and astronomical photometry (E), 51
Tests of, for astronomical pulse-counting applications (E), 181

Photoreceptors
Studied by microspectrophotometry (E), 899

Photorefractometer
Extension of sensitivity and range (T/E), 425
Measurement of N and K (E), 1043

Physics, Applied
Japanese journal, 489

Physics, Dictionary
Six-language, 908 (B)

Planets
Optical problems of television recording from approaching spacecraft (E/T), 41
Telescopes for (review), 111

Planimeter
Large-stage photoelectric (E), 1317

Plasma
Spectral properties (E), 699

Plates
Technique for evaluating half-wave and quarter-wave (E), 864 (L)

Pockels Effect
Crystals of cubic symmetry (T/E), 839
Hexamethylenetetramine (E), 320 (L)
Quartz at UHF (E), 868 (L)

Polarimetry
Photoelectric, 651 (P)
Sénarmont in analysis of laser light (E/T), 801
Technique for evaluating half-wave and quarter-wave plates (E), 864 (L)
Telescopes and, for polarization measurements (E/T), 67

Polarization
Achromatic rotators, 1180 (P)
Apparatus to measure ellipticity of surface reflected, 1180 (P)
Astronomical measurements, effects of telescopes on (T/E), 61
Circular polarizers, 1270 (P)
Film for stereoscopy, 1270 (P)
Light, film for, 330 (P)
Metallized grids for producing, 549 (P)
Semiconductor reflection, 1269 (P)
Thin film on glass, 1116 (P)
Wavelength dependence of particle (E/T), 67

Prisms
Isosceles total internal reflectors as optical elements (T/E), 1191

Projection System
Attachment to increase focal length, 1322 (P)
Color, 548 (P)
Image, 1116 (P)
Improved illumination device, 1270 (P)
Multiple superimposed images, 651 (P)
Photolithography, 549 (P)
Stereo pictures, 651 (P)

Pulse Counting
Photomultipliers for astronomical applications (E), 181

Pumping (see also *Masers*)
Using exploding wires (E), 451 (L)

Pyrometer
Optical, high-temperature, 1270 (P), 1322 (P)

Quantum Limit
To precision of wavelength determination (T), 465

Radiation
Detectivities, of cryogenic bolometers (T), 649 (L)
Detectors, information capacity, (T), 351
Electronic control of optical, 651 (P)
Passive, proximity detector, 332 (P)
Review of reviews of atomic spectroscopy, 657
Spectral variation of blackbody (T), 1113
Thermal, from hemispherical source in contact with infinite Lambert plane (T), 283
Transfer, by elliptical cylinder reflectors (T), 509

Radiometry (see also *Detectors*)
Influence of W. W. Coblentz on (E), 1098
Null-type device, 1316 (P)
Observation of extraphotographic infrared atomic emission spectra (E), 691
Small temperature difference measurement, 1322 (P)

Raman Scattering
Spectra of $Mg(OH)_2$ and $Ca(OH)_2$ (E/T), 1147
Stimulated, by giant laser pulse (T), 847

Rangefinders
Combined, and viewfinder, 1116 (P)
Prediction of systems performance (T), 277
System, 547 (P)

Ranging Systems
Infrared, 1270 (P)
Optical, pulse echo, 1270 (P)

Rare Earths
Atomic spectra (review/E), 665
Spectra of the doubly and triply ionized (E/T), 675

Ratio-Recording
Infrared spectrometer analyzer (E), 969

Referees, 179, 392, 1140, 1194

Reflection
Elliptical cylinder, radiation transfer by (T), 509
Infrared materials, bibliography, 596
Isosceles, total internal, as optical elements (T/E), 1191
Materials in 2–50 μ region (E), 591
Multilayer, coatings on metal mirrors (T), 445
Parabolic system, light weight portable for space, 1316 (P)
Reduction of internal, 651 (P)

Refraction Index
Calcium fluoride 0.23–9.7 μ (E/T), 1103
KDP (potassium dihydrogen phosphate) (E), 1334 (L)

Refractometer
Photo, extension of sensitivity and range (T/E), 425

Reticles
Comparison of AM and FM systems (T/E), 229

Ronchi Ruling
Angular measurements using (E), 77 (L)

Satellite
Photoelectric photometer for (E), 625

Scanning Systems
Condenser for flying spot, 332 (P)
Infrared, 332 (P)
Multislit, 331 (P)
Optical, 1116 (P)
Processing, one- and two-dimensional, in line (T), 401

Scattering
By mirror surfaces (E), 977
Helium–neon laser as source of measurements (E), 1205 (L)
Meter, design for submersible (T), 245
Raman, produced by giant laser pulse (T), 847
Reduction in coronagraph (E), 131
Wavelength dependence of particles on (E/T), 67

Schmidt Camera
Flat-field catadioptric (T), 1081

Scintillation
Camera for gamma rays, 652 (P)
Organic, 740 (B)

Screens
Fluorescent, 651 (P)

Semiconductors
III–V compounds, 315 (B)
Study by polarized infrared in magneto-optical studies (E), 527

Sea Water
Attenuation measurements with ruby laser (E/T), 1202 (L)

Sextant
Space, coaxial dual-field optics (E), 1265

Shadowgraph
Self-luminous objects (E), 78 (L)
Shock Tubes
Spectroscopy of excited powdered solids (E), 919
Shutters
Exploding wire blast (E), 441
Sighting Instrument
Telescope for, 548 (P)
Slits
Errors by, in pressure-broadened line measurements (T), 1195 (L)
Light collection to illuminate, in Hough-Powell digitizer (E/T), 1085 (L)
Replacement of, by screen of alternate transparent and nontransparent zones (T/E), 79
Sodium Salicylate
Preparation of layers for luminescent screens (E), 1334 (L)
Solids
Information, optical storage (T), 393
Wave mechanics of crystalline, 490 (B)
Sources
Atomic spectroscopy (review), 657
Bubble chamber, trigger-circuit for (E), 997
Electrodeless discharge, in atomic spectra analysis (E), 707
Electronic chopper for (E), 542 (L)
Gas discharge, angular distribution of light from (E), 540 (L)
Generation of sinusoidal light intensity (T), 263
Graphite resistor, for image furnace research (E), 758 (L)
Helium continuum for 600–1100 Å region (E), 617
He–Ne laser for light scattering measurements (E), 1205 (L)
Infrared, continuous from carbon arc (E), 1340 (L)
Oxide emission (E), 1335 (L)
Spectral, decay characteristics (E), 542 (L)
Spectrophotometer to measure energy distribution (E), 237
Spectrophotometers for spectroradiometry (E), 1207 (L)
Standard, new, for spectral irradiance (E/T), 1151
Ultraviolet, extreme, Schueler, improved cathode for (E), 864 (L)
Xenon, parameters and characteristics (E), 793
Spectra (see also *Spectrophotometry*)
Absorption alteration of muscovite by KBr pellet preparation (E), 177 (L)
Analysis, especially far ultraviolet, 652 (P)
Atomic, electrodeless discharge lamps in the analysis (E), 707
Atomic emission, observation of extraphotographic infrared (E), 691
Energy distribution of sources by spectrophotometer (E), 237
Excitation of second, by jet-controlled arc (E), 635
High-order grating, isolation by birefringent monochromator (E/T), 193
Infrared
Absorption of thin films, 652 (P)
Interferometric measurement of atomic emission (E), 1155
Of chars in coal structure research (E), 1109
Precision measurements (E), 1127
Reacting gases, circulating loop for (E), 1165
Iron, wavelengths by new technique (E), 177 (L)
Iron group, Mn^+, Ni^+, V^+, second spectrum (E), 687
Irradiance, new standard (E/T), 1151
Lattice vibration of $Mg(OH)_2$ and $Ca(OH)_2$ (E/T), 1147
Line profile
Polychromator for time-dependent observations (E), 205
Vacuum arcs (E), 699
Mercury Optical excitation by resonance radiation (E), 1323
Microdensitometer for scanning angularly oriented lines (E), 1207 (L)
Oxide molecule emission (E), 1335 (L)
Rare earths
Atomic (review/E), 665
Doubly and triply ionized (E/T), 675
Recording of band intensities (E), 611
Sky in 15–26 μ region (E), 571
Slit introduced errors in measurements (T), 1195 (L)
Standards, international wavelength, 224 (N)
Thermoluminescence, spectrophotometer (E), 243
Wavelength measurement with concave grating spectrograph (E), 715
Spectrograph
Automatic speed-of-scan double-beam infrared, 1168 (P)
Bass-Kessler grating, construction and calibration (E), 451 (L)
Concave gratings for astronomical (E/T), 187
High-resolution, application to study of simple molecules (E), 909
Infrared, six-meter Ebert-type (E), 1123, 1127
Predisperser for high-resolution grating (E), 963
Wavelength measurement with concave grating (E), 715
X-ray, 548 (P)
Spectrometers
Cell structure, cavity-type liquid for, 332 (P)
Concave gratings for astronomical (E/T), 187
Direct recording of band intensities (E), 611
Grating, or analyzer, 330 (P)
Grating, foreprism drive (E), 175 (L)
Grating, improved operation, 1322 (P)
In-line infrared, 331 (P)
Interferometric, high-resolution scanning (E/T), 873
Mass, improved resolution, 330 (P)
Null-type device, 1316 (P)
Quantum limit to wavelength determination (T), 465
Replacement of slits by screen of alternate transparent and nontransparent zones (T/E), 79
Servo correction for errors, 1322 (P)
Two-wavelength, two-frequency ratio recording infrared analyzer (E), 969
Spectrophotometry
Atomic absorption (E), 931
Asymmetry of an integrating sphere (E), 631
Density-recording ultraviolet, vacuum (E), 321
Dual-channel pulse-counting astronomical (E), 165
Flame, temperature compensation for, 331 (P)
Infrared
Calibration (E), 1303
Effect of extraneous radiation on (T/E), 1141
Optical null (E), 1309
Micro (E), 899
Rapid scanning for thermoluminescence spectra (E), 243
Spectral energy distribution of light sources (E), 237
Universal (E), 1295
Used as spectroradiometers (E), 1207 (L)
Wedge for double-beam, 330 (P)
Spectroradiometry
Infrared, of liquid propellant flames (E), 1133
Use of spectrophotometers for (E), 1207 (L)
Spectroscopy
Absorption cell of simple construction, White-type multiple pass (E), 764 (L)
Advances, 740 (B)
Atomic (review), 657
Automatic dispersion controlled, 1180 (P)
Brighter images using anamorphic optics (T), 755
Device, 549 (P)

Dielectric coatings, selection of, for Fabry-Perot interferometry (E), 727
Dispersion measurement of vibration–rotation lines in gases (E), 495
Electron chopper for spectral lamps (E), 542 (L)
Excitation in spark discharge, 734 (B)
Excitation symposium, 316 (B)
Flame, bibliography, 1132 (N)
Image inverter for projector comparator (E), 763 (L)
Infrared, Coblentz contributions (E), 1090
Infrared, far, absorption at liquid helium temperature from chromium ions in ruby (E), 977 (L)
Interference comparators of line standards (E), 471
Interferometry, tilted-plate, with large plate for high resolution (E), 817
Molecular, 740 (B)
Plasma, 734 (B)
Shock-excited powdered solids (E), 919
Solar simulations (E), 105
Standards, 740 (B)
Ultraviolet, extreme, Schueler lamp (E), 864 (L)
X-ray, performance of curved crystals in range 3–12 Å (E), 955

Spin-Coupled Systems
Electron-nuclear, non-Boltzmann population distribution in four-level system (T), 787

Spot Diagrams (see *Image Evaluation*)

Standards
Infrared by Fabry-Perot fringe scanning (E), 1155
Length, international (E), 455
Line, interference comparators for (E), 471
Spectral irradiance, new (E/T), 1151
Wavelength, secondary, 224 (N)

Star Tracker, 1270 (P)

Stereoscopy
Attachment for viewers, 1180 (P)
Polarization film for, 1270 (P)
Projection of pictures, 651 (P)
Transparent screen to produce, 1116 (P)

Sun
Absorption by ozone in the 4.75-μ spectrum (E), 581
Absorptivity calculations, selected ordinates (T/E), 109, 810
Atomic spectra of the rare earths, presence in, (review/E), 665
Imaging furnace, kaleidoscope for uniform flux (T/E), 265
Low, phenomena (E), 199, 1336 (L)
Observatory on Long Island (E), 93
Optics
In equipment to utilize energy, 454 (B,N)
Radiation, infrared transmission of atmosphere (E/T), 887
Reflecting coronagraph (E), 977
Research, sensitive visual photometer for (E), 89
Spectra, absorptance of infrared by atmospheric gases (T), 605
Spectra, simulation with filtered high-pressure xenon lamp (E), 105

Surfaces
Aluminum, uncolored anodized, appearance (E), 448 (L)
Fabrication of aspherical (E), 1181

Tachistoscope
Projection, 1269 (P)

Telescopes
Alignment device, 548 (P)
Analyzer for stellar images (E/T), 31
Auxiliary optical systems for Kitt Peak (E/T), 141
Binocular, 333 (P)
Corrector plate, 548 (P)
Design
Baker-type off-axis $f/0.35$ solid Schmidt camera, (T/E), 201
Dual-image reflecting, 1316 (P)
$f/5$ solid telescope (T/E), 201
Focusing objective of, 550 (P)
Image quality, limitations of, of large (E/T), 23
Image stabilizer, 651 (P)
Planetary (review), 111
Polarization measurements
Effects of, on astronomical (T/E), 61
Use in (E/T), 67
Problems in long-focus photographic astrometry (E), 9
Schmidt–Cassegrain, short, for sextant (E), 1265
Sighting instrument use, 548 (P)
Solar, Kitt Peak, 222 (N)
U. S. Naval Observatory 60-in. astrometric reflector (E), 1

Television
Problems of, recording of moon and planets from spacecraft (E/T), 41
Three-color image using fiber optics, 333 (P)

Temperature
Measurement, 282 (B)
By pyrometer, 1270 (P)
Optical methods to measure, in plasma, 298 (B)
Radiometer measurement of small difference, 1322 (P)

Theodolite
Coordinate, 1269 (P)

Thermoelectricity, 316 (B)

Thermoluminescence
Spectra, spectrophotometer for (E), 243

Transfer Characteristics
Contrast, role of eikonal and matrix, in calculations (T), 1239
Image motion and air condition, in aerial photography (E/T), 379

Transfer Functions
Image evaluation and (T/E), 335
Optical
Calculation from lens-design data (T), 359
Measurement
Instrument (E/T), 365
Shearing interferometer for microscope (E/T), 371
Modulation, use in testing aerial cameras (T/E), 545 (L)
Test objects, sinusoidal (T/E), 273

Transistor
Optical, 1173 (N)

Transit
Surveying, 652 (P)

Transmission
Infrared
Atmosphere (T), 561
Atmosphere to solar radiation (E/T), 887
Materials, bibliography, 596
Material in 2–50 μ region (E), 591
Optimum, in absorption measurements and Beer's law (T/E), 937
Single path band, factors, from double path measurements (T), 503
Water band, infrared in 2.7 μ (T/E), 1117

Turbulence
Effect on transfer characteristics in aerial photography (E), 379

Ultraviolet
Absorber for, added to organic polymeric structure, 651 (P)
Alkali metal filter, 330 (P)
Extreme, Schueler lamp, improved cathode (E), 864 (L)

Far, spectra analysis, 652 (P)
Monochromator, 1322 (P)
Sodium salicylate, layer preparation for screens (E), 1334 (L)
Units and dimensions, 714 (N)
Vacuum
Density-recording spectrophotometer (E), 321 (L)
Photoionization detector (E), 735

Venus
Atmosphere, 297 (B)

Viewfinder
Block-type Albada, 1180 (P)

Viewers
Attachment for stereoscopic, 1180 (P)

Vision
Research, journal, 310

Water Vapor
Adsorption on walls, introduces infrared absorption errors (E), 1196 (L)
Infrared absorption at 2.7-μ band (T/E), 1117
Infrared, near, total absorptance (E), 585

Wavefront Reconstruction
Three-dimensional (E), 409

Wavelength
Determination, quantum limit to (T), 465
Measurement with concave grating spectrograph (E), 715

Windows
Bubble-chamber
Optical and mechanical properties (E/T), 999, (E) 1037, 1137

Xenon Lamps
Flash, effect of pre-excitation on quality (E), 1329 (L)
Flash for large Wilson cloud chamber (E/T), 1013
Limiting parameters and generalized characteristics (E), 793
Solar spectrum simulation (E), 105

Xerography
Magnetic image recording, 547 (P)
Masking, color, 547 (P)
Type, process, 1316 (P)

X Rays
Advances, 806 (B)
Curved crystal performance in range 3–12 Å (E), 955
Fifty years of, diffraction, 832 (B)
Photofluorography, light meter, 1269 (P)
Reflections from crystals, 885 (B)
Spectrograph, 548 (P)
Spectroscopy, bibliography, 885 (B)

Young, Thomas
Biography, 639

Author Index to Volume 2

Aagard, R. L., 509, 540
Aikens, R. S., 157
Alamichel, C., 495
Altman, J. H., 648
Arcas, Ph., 909
Arndt, J., 507
Ashley, E. J., 156
Assous, R., 495

Baird, D. H., 839
Baird, K. M., 177, 455, 471, 501
Baker, J. G., 111
Ballard, S. S., 16, 323
Barchewitz, P., 909
Barker, W. A., 787
Barnes, M. W., 177
Barr, E. S., 639
Bartleson, C. J., 310
Bartz, A. M., 969
Bass, A. M., 1335
Baurer, T., 451
Bell, W. E., 317
Bennett, H. E., 156
Bennett, J. M., 156, 1330
Berkowitz-Mattuck, J. B., 265
Bernstein, J. B., 1169
Billings, B. H., 430
Birks, J. B., 740
Blachman, N. M., 444
Bloembergen, N., 8
Bloom, A. L., 317
Bloom, L. R., 839
Boettner, E. A., 105
Bohlin, D., 131
Bolle, H. J., 571
Bond, W. L., 761
Borkan, H., 253
Bowen, D. E., 833
Bowie, G. E., 1061
Bowman, R. L., 176
Bradbury, R. A., 867
Bradley, D. J., 539, 725
Brixner, B., 1281, 1331
Brouwer, W., 1239
Brown, W. M., 401
Brunelle, Jr., H. E., 1265
Buchanan, R. A., 1147
Buhrer, C. F., 647, 839
Burch, D. E., 585
Burge, D. K., 1202
Burke, T. G., 1165
Buser, R. G., 861

Cagle, Jr., F. W., 282
Calfee, R. F., 1117
Callahan, L. G., 401
Caplan, P. J., 291
Carman, P. D., 1317
Carpenter, R. O'B., 229
Caspers, H. H., 1147
Chabbal, R., 873
Chace, W. G., 441
Chapman, R. M., 297
Chen, M. M., 265
Christensen, R. L., 1049
Church, C. H., 451
Clark, G. L., 806
Cleek, G. W., 584, 590, 741
Clough, S. A., 611
Cohen, A. J., 604
Cohen, H. G., 1231
Collins, D. A., 411
Collins, S. A., 448
Conway, J. G., 707
Cooke, F., 328, 408, 978, 1088, 1294
Cooper, III, W. S., 205
Cope, A. D., 253
Crawford, Jr., B. L. 489
Crosby, J. K., 1339
Crosswhite, H. M., 675
Cummins, H. Z., 823

Dalton, Jr., M. L., 1195
Damon, E. K., 163, 440, 546
Davis, S. P., 727, 963
Davis, W. W., 66
Decius, J. C., 664
Deeg, E. W., 999
DeKinder, Jr., R. E., 827
Deirmendjian, D., 1336
Delano, E., 1251
de Lhery, G., 291
DeMaria, A. J., 807, 1085
Dennis, J. H., 1334
De Vany, A. S., 201
Dhumwad, R. K., 1335
Diago, M. C., 687
Di Domenico, Jr., M., 431
Dieke, G. H., 675
Dreyfus, M. G., 1113
Dufault, R. A., 540
Dyson, J. J., 487

Eden, D. D., 868
Edgerton, H. E., 570, 1013
Eichhorn, H., 17
Eisner, E., 755
Ejiri, A., 321
Elliott, Jr., S. D., 625
Evans, J. W., 193
Evtuhov, V., 319
Ewanizky, T., 291

Feder, D. P., 272, 1209, 1227
Feibelman, W. A., 199
Feldman, C., 734
Ferriso, C. C., 175, 760
Fish, C. V., 441
Fish, R. A., 31
Flynn, J. T., 163
Fox, A. G., 544
Fraley, P. E., 1127, 1340
France, W. L., 585
Fred, M., 715
Friedel, R. A., 1109
Friedman, B., 236
Früngel, F., 1017

Gagosz, R., 807
Gardner, I. C., 832
Garing, J. S., 358
Gates, D. M., 887, 1117
Gehrels, T., 67
Gelles, R., 1081
George, T. V., 1198
Ghosh, A. K., 243
Gibb, Jr., T. R. P., 282
Girard, A., 79
Givens, M. P., 885
Glaser, P. E., 265
Görlich, P., 1069
Green, A. E. S., 561
Griggs, M., 561
Groner, W., 1204
Grosjean, C. C., 501
Grosof, G., 299
Grosso, R. P., 764
Grum, F., 237
Gullón, M. N., 687
Gumlich, H.-E., 886
Gutmacher, R. G., 707
Haar, L., 838
Hadni, A., 977
Haeusler, C., 909
Hall, A. C., 864
Hammond, III, H. K., 1207
Hanes, G. R., 465
Hansen, D. W., 1117
Harrick, N. J., 1203
Harrop, W. J., 887
Haun, Jr., R. D., 451
Hauser, S. M., 1175
Heard, H. G., 1329
Heavens, O. S., 479, 800
Hegarty, J. C., 78
Hellerstein, D., 801
Hellwarth, R. W., 847
Hemmendinger, H., 1108
Hendeberg, L. O., 379
Hennes, J. P., 735
Herriott, D. R., 826, 865
Herzberger, M., 553
Ho, L., 647
Hodge, E. S., 740, 763
Hoffman, A. R., 649, 1201
Holleran, R. T., 1336
Honey, R. C., 1339
Hook, L., 66
Hopkins, R. E., 1227
Horey, Jr., E. C., 763
Howard, J. N., 30, 218, 228, 378, 420, 463, 616, 714, 853, 946, 1036, 1140, 1196, 1256
Howlett, L. E., 455
Huffman, R. E., 617, 947
Hughes, H. K., 937

Humphreys, C. J., 691, 1155
Hyde, W. L., 227, 962, 1232

Iglesias, L., 687
Imbusch, G. F., 817, 1330
Ingelstam, E., 908
Irland, M. J., 540

Jackson, J. K., 1151
Jaffe, J. H., 734
Joffrin, C., 909
Jones, J. L., 955
Jones, R. C., 351
Jones, R. N., 1090
Julich, H., 263

Kahn, H. L., 931
Kainz, J., 861
Kapany, N. S., 425, 1043
Karoli, A., 316
Kaye, W., 1295
Keck, P. H., 827, 833
Kester, J. E., 283
Kingston, R. H., 1334
Kirk, D. D., 1169
Knable, N., 823
Knapp, R. A., 1334
Köhler, H., 1017
Kotin, L., 66
Kreidl, N. J., 589

Laikin, M., 91
Lamberts, R. L., 273
Landon, D. O., 450
Langton, W. G., 364
Larrabee, J. C., 617, 947
Legay, F., 495
Levi, L., 421
Levine, M. A., 78
Levinstein, H., 315
Lewis, B., 886
Li, T., 544
Liller, W., 187
Loewenstein, E. V., 491, 1332
Low, F. J., 649
Ludman, J. E., 862
Lynnworth, L. C., 92

MacAdam, D. L., 7, 648
Mack, J. E., 873
Mackey, R. C., 542
Mahan, A. I., 908
Malitson, I. H., 741, 1103
Marchand, E., 359
Marlowe, D. G., 1175
Marquet, L. C., 963
Marquis, D. C., 726
Marshak, I. S., 793
Martz, D. E., 749
Martz, Jr., E. P., 41
Maurer, R. D., 87
Maust, Jr., E. E., 758
McCaa, D. J., 581
McCarthy, D. E., 591
McClure, N. R., 553
McCrone, W. C., 298
McCubbin, Jr., T. K., 764
McKenna, J., 303
McKiernan, M. A., 503
McLachlan, Jr., D., 832
McMurtry, B. J., 767
McNally, Jr., J. R., 699
McNutt, D. P., 873
McQuaid, R. W., 320
Meggers, W. F., 657
Megla, G. K., 311
Mertz, L., 1332
Meyer, C., 909
Meyer-Arendt, J. R., 77, 409, 508
Miedler, L. J., 105
Miller, R. H., 61
Miller, W. A., 93
Minami, S., 1309
Minardi, J. E., 283
Miner, Jr., E. D., 77
Miyamoto, K., 1247
Mollenauer, L. F., 817, 1330
Moore, C. E., 665
Moore, Jr., F. L., 635
Moore, J. G., 625
Moos, H. W., 817, 1330
Morgan, S. P., 544
Murphy, J., 1147
Murray, B. C., 749
Murty, M.V.R.K., 1337
Mutschlecner, J. P., 1202

Narchal, M. L., 787
Neeland, J. K., 319
Nelson, D. F., 410
Newburgh, R. G., 864
Newkirk, Jr., G., 131, 977
Newman, A. H., 365
Nicholls, R. W., 919
Nicholson, J. B., 955
Nielsen, H. H., 1123
Noyce, R. H., 177

Offner, A., 153
Öhman, Y., 89
Olson, O. H., 109, 631
Onaka, R., 321
O'Neill, E. L., 1239
Osial, T. A., 451
Overend, J., 1042

Paix, D., 249
Palik, E. D., 527
Palmer, R. B., 1025
Parkinson, W. H., 919
Paschen, K. W., 955
Patrick, F. B., 277
Paul, Jr., E., 691
Penner, S. S., 282
Pfeiffer, A., 1287
Phillips, R., 359
Plass, G. N., 515
Plyler, E. K., 480, 1089
Pollack, S. A., 542
Pontarelli, D. A., 425, 631, 1043
Potter, R. J., 1049
Powers, W. T., 157

Ramsay, D. A., 740
Rao, K. N., 1123, 1127, 1340

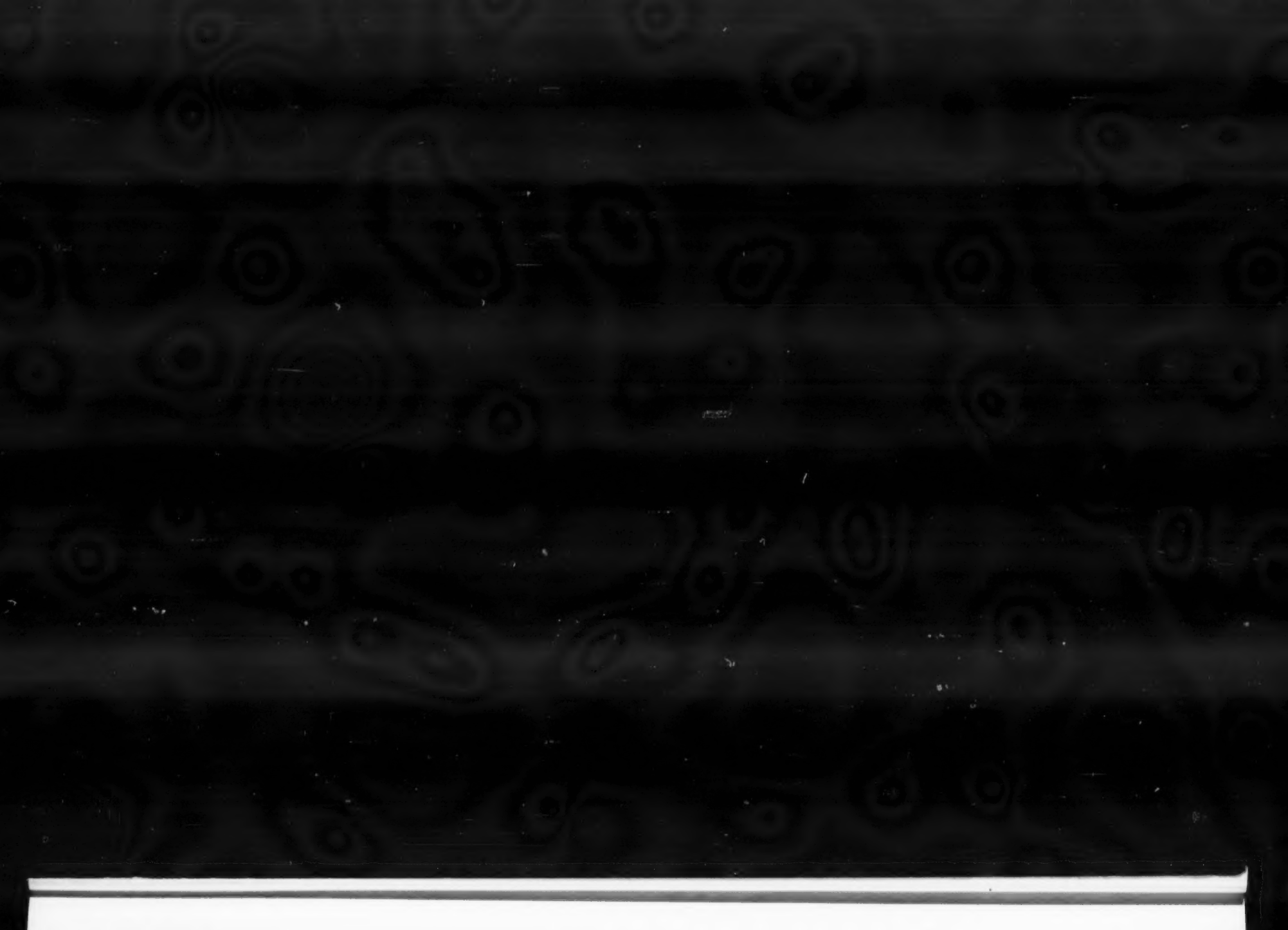
Reader, J., 963
Ready, J. F., 151
Redmann, J. J., 827, 833
Reeves, E. M., 919
Regelson, E., 1202
Reinhard, H. P., 1017
Reitmayer, F. O., 999
Rempel, R. C., 317
Rodman, J. P., 165, 181
Roesler, F. L., 873
Rohlin, J., 762
Rosenau, Jr., M. D., 545
Rosin, S., 1003, 1085
Rothstein, J., 1191
Rottmann, H. R., 1333
Ruhl, H. D., 969
Ruthberg, S., 177

Sakurai, T., 1181
Sanderson, J. A., 1098
Saunders, J. B., 541
Saur, R. L., 448
Schawlow, A. L., 817, 1330
Schermer, E. B., 540
Schneider, W. E., 1151
Schraeder, A. E., 1323
Schuldt, S. B., 509, 540
Schulte, D. H., 141
Schurin, B., 611
Schwab, W. G., 1165
Scolnik, R., 735
Scott, R. M., 584
Shannon, R. R., 365
Sharp, J. V., 826
Shaw, J. H., 176, 581, 605
Sherman, B., 276
Shishido, K., 1181
Shortley, G., 480
Siegler, E. H., 663
Silverman, S., 726
Sims, W. P., 997
Skidmore, M. R., 699
Slama, L., 1198
Slavin, W., 931
Smith, D. F., 1165
Smith, D. S., 177
Smith, F. D., 335
Smith, H. J., 181
Smith, L. S., 1175
Somers, E. V., 451
Spanbauer, R., 1340
Spencer, G. H., 1257
Speyer, E., 207
Spillman, G. R., 205
Stair, R., 1151
Stammreich, H., 740
Stavroudis, O. N., 741
Sterzer, F., 1197
Stewart, J. E., 1141, 1303
Stickley, C. M., 855, 867
Stierwalt, D. L., 1169
Stober, A. K., 735
Stoicheff, B. P., 811
Stoliar, A. P., 1204
Strand, K. Aa., 1
Strandberg, M. W. P., 792
Stroke, G. W., 470, 481
Strong, J., 1101
Strother, G. K., 899
Sullivan, J., 861
Sutton, L. E., 741, 1275
Svelto, O., 431
Szabo, A., 811

Tanaka, Y., 617, 947
Tang, C. L., 545
Targ, R., 299
Taylor, C. A., 885
Taylor, J. H., 1075
Teska, T. M., 67
Texereau, J., 23
Theissing, H. H., 291
Thiess, G. H., 868
Thygesen, K. H., 635
Tomkins, F. S., 715
Tomlinson, R. G., 546
Tourin, R. H., 298, 1133
Tsuruta, T., 371
Twersky, V., 236
Tyler, J. E., 245

Van de Kamp, P., 9
van Heerden, P. J., 387, 393, 764
van Thanh, N., 909
Vaško, A., 603
Velasco, R., 687

Walther, A., 1239
Warnke, W. E., 758
Weber, J., 806
Welander, W. E., 379
Welford, W. T., 981, 1037
Wessely, H. W., 503
Westphal, J. A., 749
White, C. E., 827, 833
White, G. R., 448
Wieder, H. H., 411
Wiberly, S. E., 706
Wiebe, A. F., 1207
Wilcox, J. M., 205
Willey, Jr., R. R., 1265
Williams, D., 271, 585
Williamson, D. E., 290, 611
Wilson, A. D., 1055
Wilson, M. K., 664
Winsberg, S., 869
Witmer, E. E., 800
Wolfhard, H. G., 490
Wolken, J. J., 899
Woodward, D. H., 1205
Worden, E. F., 707
Wormell, P. M. J. H., 1233
Wynne, C. G., 1233

Yamamoto, S. S., 997
Yeh, Y., 823
Yoder, Jr., P. R., 1175
Yokoyama, M., 1198
Young, A. T., 51, 1060
Young, L., 445

Zimmerman, J., 759
Zirin, H., 977
Zisk, S. H., 31
Zito, Jr., R., 1323